

## A New Pygmy Mole Grasshopper from California and Baja California, Mexico (Orthoptera: Tridactylidae)

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In the course of my revision (Günther, 1977) of the pygmy mole grasshopper genus *Ellipes* Scudder, I found a series of 14 males and 12 females from Anza-Borrego, San Diego Co., California, that due to their extensive yellow coloration, were distinctly different from other specimens of *E. gurneyi* Günther. At that time I considered these specimens to be only a color variation of the latter species for both morphotypes came from the same locality. Recently, in determining the Tridactylidae from Baja California, Mexico, I found further material of this supposed "variation" from three localities. A detailed examination showed that these Baja California specimens agree with both the morphological and color variation of the Anza-Borrego individuals. Both typical *E. gurneyi* and this "variant" live sympatrically in a wide area without transition forms. For these reasons, combined with distinct morphological differences (see below), this variant must be considered a good species.

### *Ellipes californicus*, NEW SPECIES

*Diagnosis.*—A predominately black, although extensively yellow-marked species. Pronotum black, yellow-marked as in Figure 1a. Hind femur outer distal lobus genicularis white in caudal half. Antennae in males with 11 segments, females with 12. Hind wings not reaching end of abdomen. Hind tibia with one pair of narrow tibial lamellae. Caudal border of female subgenital plate parabolically rounded, without inner sclerotisations at hind end (Fig. 2). Epiproct of males not longer than broad (Fig. 3b), distinctly shorter than that of *E. gurneyi*. Hooks of paraproct long, tapered (Fig. 3a). Endophallus with 2 sclerotised bristle areas similar to *E. gurneyi* (Fig. 4a) but more slender.

Both sexes of the new species differ from those of *E. gurneyi* in the pronotal pattern (Fig. 1a, b). The male also differs by the form of the epiproct (Fig. 3b—compare with Fig. 36 in Günther, 1977), by the bristle areas of the endophallus, and by the shape of the subgenital plate (see below). The most important difference in the female is its characteristic egg guide plate (Fig. 2). Males of the new species differ from *E. monticolus* Günther by the bristle areas in the endophallus (only two, similar to *E. gurneyi*) and the caudal margin of the subgenital plate. Females are distinguished by the simple rounded end of the subgenital plate (Fig. 2—compare with Fig. 59 in Günther, 1977).

In the description below, coloration is described in detail for the holotype only since there is some variation in the type series. The morphological description that follows refers to the type series, including the holotype.

*Holotype male.*—Mexico, Baja California Norte, Sierra San Pedro Martir, Dia-

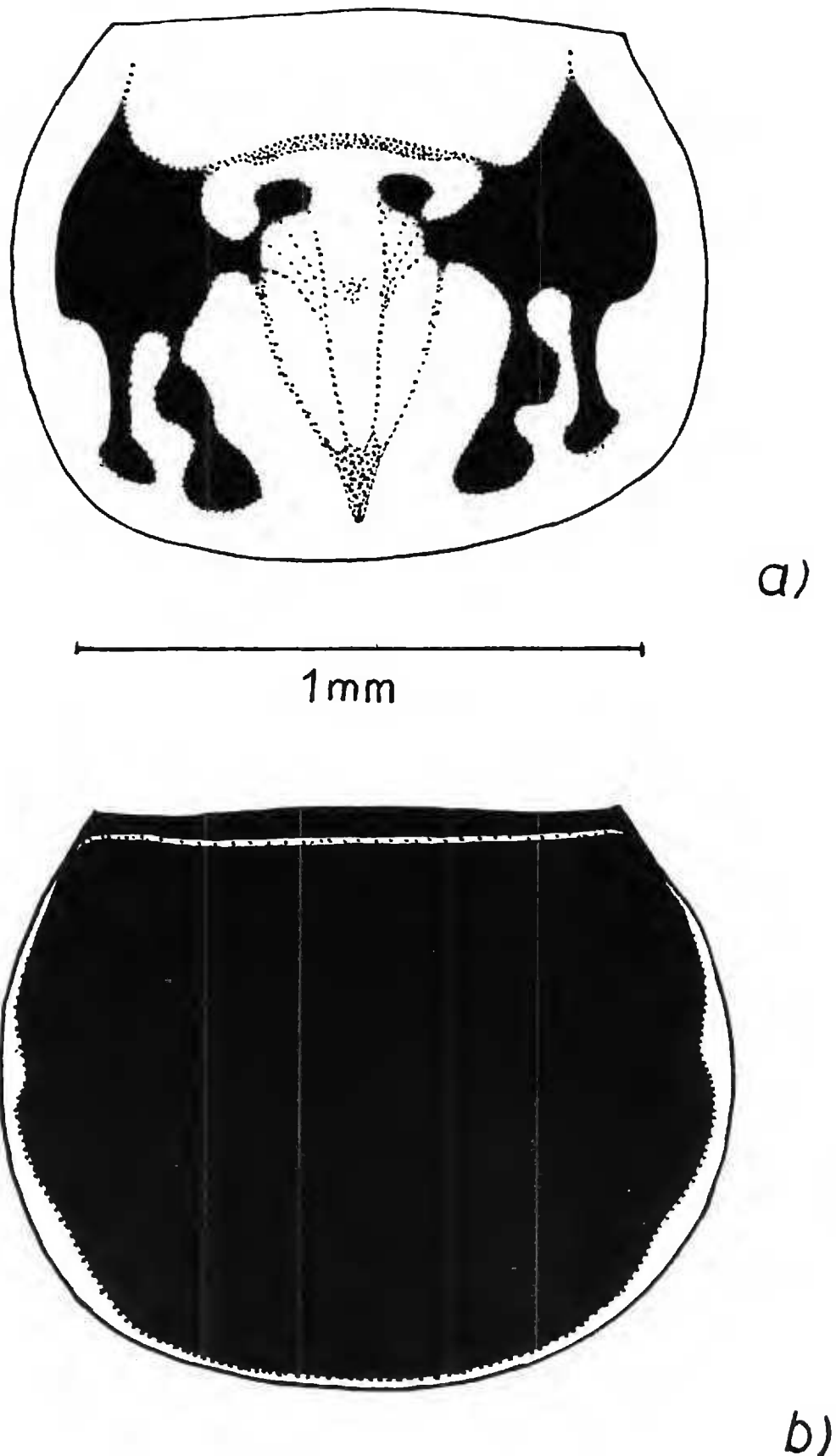


Figure 1. Pronotum: a) *E. californicus* holotype; b) *E. gurneyi* (male).

blo Canyon, E slope, 6-IV-1973, S. L. Szerlip, on damp sand at edge of stream. Deposited in California Academy of Sciences (CAS), #15045, on indefinite loan from University of California, Berkeley.

*Coloration.*—Predominant color brown to black, but with yellow-white markings. Antennae black-brown, first segment laterodistal with a yellow spot. Palpi black-brown, yellow at articulations. Compound eyes black-brown, ocelli glassy white. Oral border of antclypeus yellow. Laterooral parts of postclypeus yellow. Frons with yellow crescent-shaped marking on each side. Eyes bordered with yellow on inner aspect between lateral ocellus and occiput. Vertex between eyes

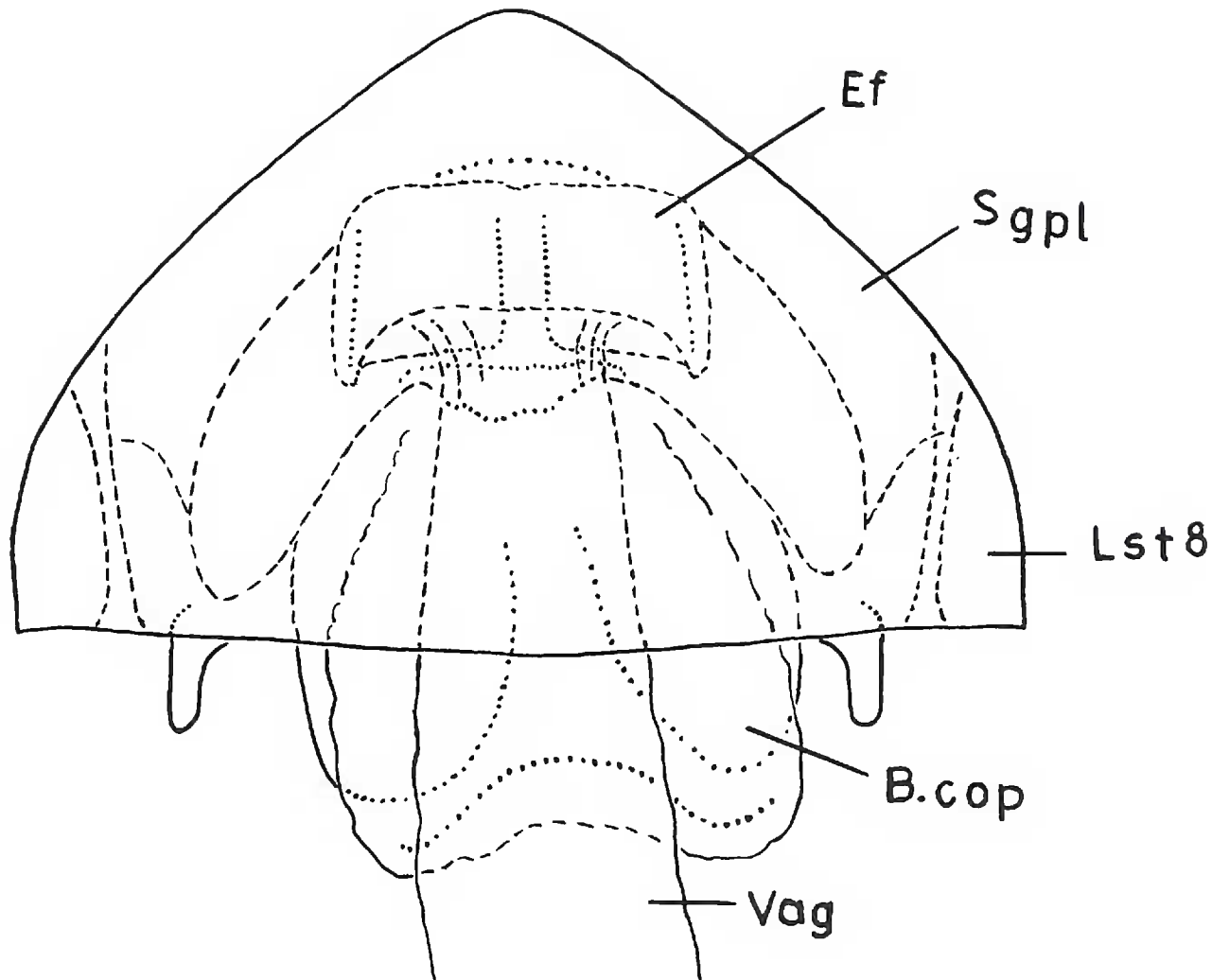


Figure 2. *E. californicus* paratype female: subgenital plate and bursa copulatrix, ventral view. Ef—egg guide; B. cop—bursa copulatrix; Lst 8—laterosternite 8; Sgpl—subgenital plate; Vag—vagina.

with a thin Y-shaped yellow marking; caudally an irregular yellow band connects both eyes; from that band two yellow stripes run to the occiput. Genae white. Border of antennal insertion yellow. Pronotum characteristically marked with yellow (Fig. 1a). Fore legs black-brown; distal coxa and main part femur yellow; tibia with yellow spots. Middle legs black-brown; distal coxa and main part trochanter yellow-white; femur bordered yellow ventrally with an incomplete sub-basal and broad medial yellow crossband as well as yellow at the distal end; outside of tibia with 3 yellow spots, 2 near dorsal border and 1 at middle of ventral border. Hind femur bordered with yellow at dorsal and ventral edge to distal joint region; dorsobasal lobe yellow, outside with 2 yellow crossbands, each interrupted once; distal lobus genicularis white in caudal half; tibia yellow, blackish smoked. Tegmina with broad white crossbands such that only base and distal third remain black-brown. Costal area of hind wing black-brown bordered, other parts transparent. Abdomen black to black-brown; sternites 1 to 8 bordered white caudally; subgenital plate with broad white distal part. Basal segments of cercus black-brown; distal segment of cercus and appendage of paraproct light brown.

*Measurements of holotype (mm).*—Body length: 4.22. Length pronotum: 0.96. Breadth pronotum: 1.22. Length fore wing: 1.40. Length hindwing: 2.44. Length metafemur: 2.59. Breadth metafemur: 0.91. Length metatibia: 2.07. Length apical spurs: 1.04. Length subapical spurs: 0.47. Length tibial lamellae: 0.32. Length metatarsus: 0.09. Length basal cercus segment: 0.45. Length distal cercus segment: 0.19. Length paraproct appendages: 0.54. Interocular distance: 0.43.



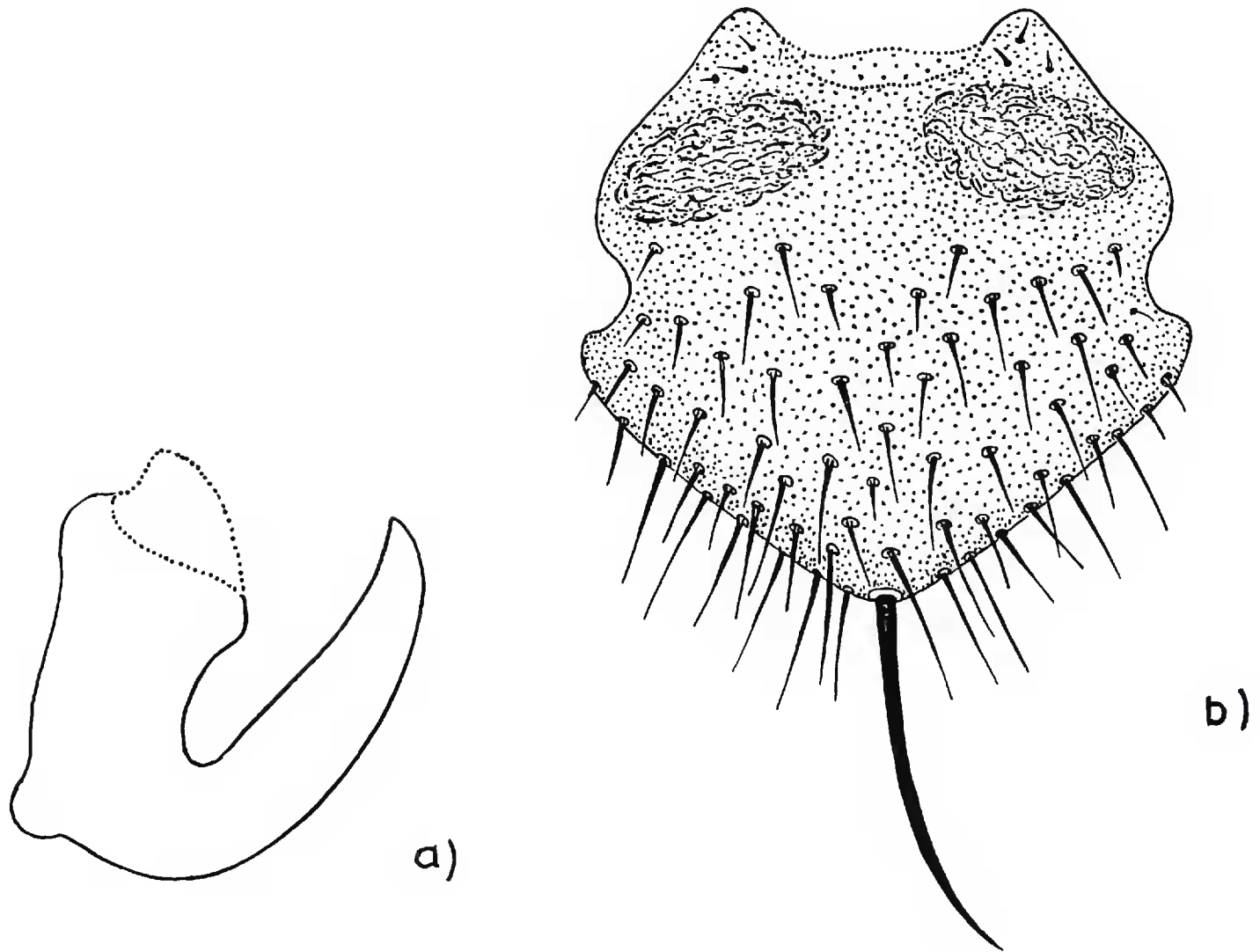
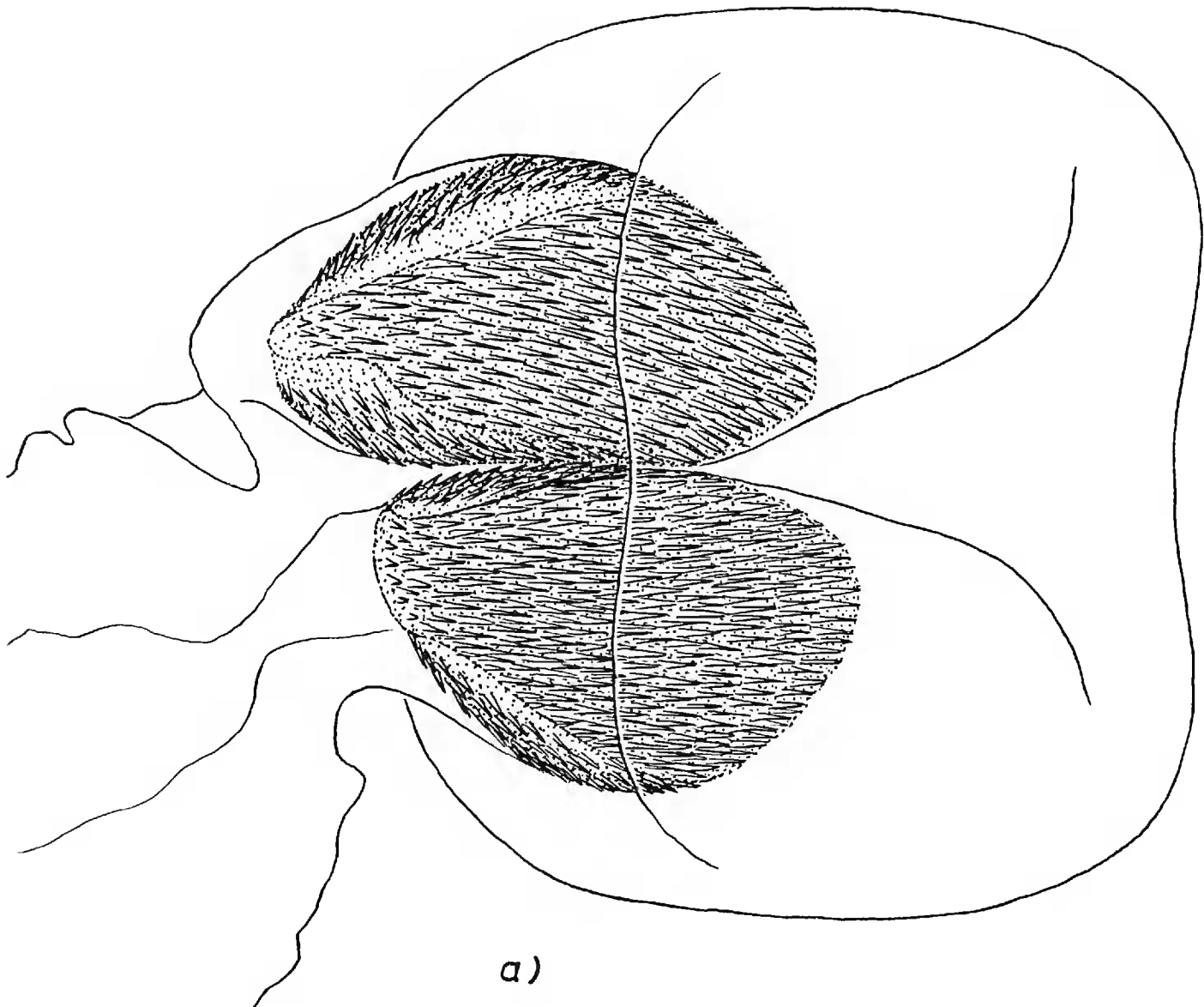


Figure 3. *E. californicus* male paratype: a) hook of right paraproct; b) epiproct.

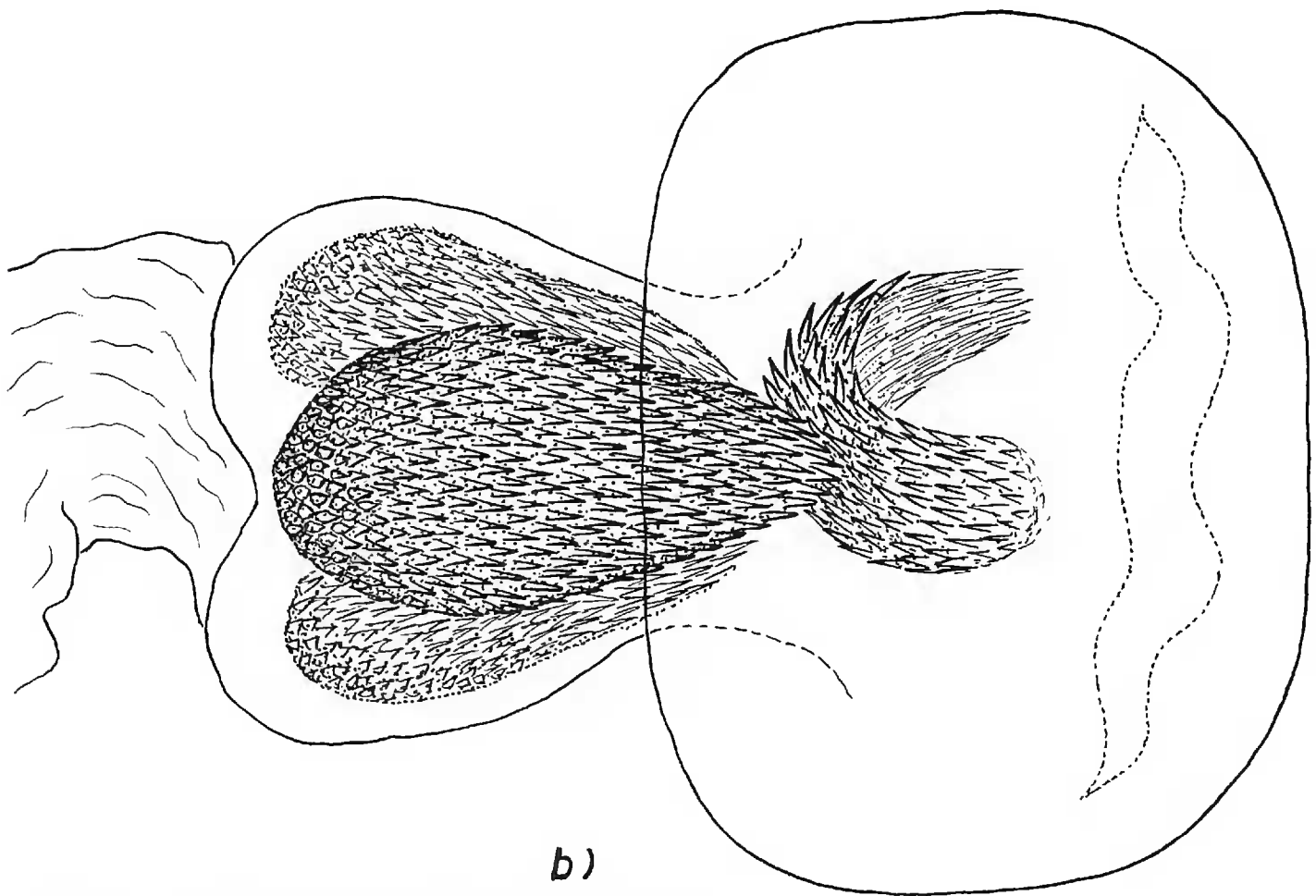
*Allotype female.*—Same data as holotype. Coloration same as in holotype except abdominal sternites 1 to 6 are yellow, sternite 7 black-brown with white caudal border, and the subgenital plate is black to black-brown.

*Measurements of allotype (mm).*—Body length: 4.81. Length pronotum: 1.11. Breadth pronotum: 1.48. Length fore wing: 1.48. Length hindwing: 2.81. Length metafemur: 3.03. Breadth metafemur: 1.04. Length metatibia: 2.44. Length apical spurs: 1.17. Length subapical spurs: 0.56. Length tibial lamellae: 0.40. Length metatarsus: 0.09. Length basal cercus segment: 0.54. Length distal cercus segment: 0.22. Length paraproct appendages: 0.61. Interocular distance: 0.52.

*Morphology of type series.*—Coloration generally as above. Stature typical for *Ellipes*. Antennae filiform, males with 11 segments, females with 12; segment 3 distinctly longer, about as long as segment 4 plus 5; beginning with segment 4, which is as long as broad, segment length increases to tip of antenna; length of terminal segments about twice width. Lateral border of pronotum emarginated; laterocaudal corner rounded and protruded to ventral side; outline of pronotum as in Figure 1a. Front femur specialized for digging, provided with long bristles among hairs on outer ventral edge and with dense row of flat bristles on medio-ventral edge. Hind tibia with long apical spurs, these are half the length of tibia; subapical spurs nearly half the length of apical spurs; a slender tibial lamella occurs on both outer and inner dorsal edges. Tarsus of hind legs rudimentary, present as scarcely visible lobe. Tegmina of male tapered, terminating obliquely; distal third subcosta developed as stridulatory vein with about 55 teeth. Fore



a)



b)

Figure 4. Phallus: a) *E. gurneyi*; b) *E. monticolus*.

wing of female rounded at end, development of subcosta normal. Hind wing two-thirds longer than tegmina, not reaching end of abdomen.

*Male terminal abdomen segments.*—Shape of tergite 10, cerci, paraproct appendages as in *E. gurneyi* (see Günther, 1977:Fig. 35). Epiproct not longer than broad (Fig. 3b), tapered to end and with 2 swellings at base. Hooks of paraprocts strongly developed, with long distal part which curves upward and tapers to end (Fig. 3a). Subgenital plate nearly as long as broad, caudal border emarginated distinctly. Phallus membranous, endophallus with 2 long sclerotised areas, covered densely with bristles similar to *E. gurneyi* but more slender. Median part tergite 8, caudal margin, with 2 or 2 pairs of strong bristles. Median part of tergite 9 without such bristles.

*Female terminal abdomen segments.*—Chaetotaxy similar to male. Epiproct tongue-shaped, tapered to rounded end. Outline of subgenital plate parabolic (Fig. 2). Egg guide plate situated between subgenital plate and gonoporus; bursa copulatrix large, membranous, baggy, bilobed at inner end. Spermatheca absent. Rudiments of gonapophyses represented on each side by 2 small sclerites, these situated on ventral side of medially-divided sternite 9, covered by subgenital plate; ventral rudiment is triangular, other rudiment slender.

*Paratypes.*—MEXICO: BAJA CALIFORNIA NORTE: Sierra San Pedro Martir, Diablo Canyon, E slope, 6-IV-1973, S. L. Szerlip, 7 ♂, 5 ♀, 4 nymphs with holo- and allotype (CAS, University of California—Berkeley, Zoological Museum Berlin); Diablito Canyon, E face, 5-IV-1973, on damp sand at edge of stream, S. L. Szerlip, 1 ♂, 3 ♀ (CAS). Sierra Juarez Mts., El Tajo Canyon, 9-IX-1957, J. Roberts, 2 ♀ (Los Angeles Co. Museum).

*Further specimens (not designated paratypes).*—USA: CALIFORNIA: San Diego Co., Anza-Borrego State Park, Coyote Creek, 25-III-1959, D. C. Rentz, 14 ♂, 12 ♀ (CAS, University of Michigan Museum of Zoology, Zoological Museum Berlin). According to A. B. Gurney (pers. comm.) there are an additional 10 ♂ and 4 nymphs in the collection of the U.S. National Museum from Coyote Creek with collection date 15-II-1969.

#### KEY TO *ELLIPES* SPECIES OF THE *GURNEYI-MONTICOLUS* GROUP

1. Antennae of male and female with 10 segments . . . . . *E. minutes* (Scudder)  
Antennae of male with 11 and female with 12 segments . . . . . 2
2. Phallus with long strong sclerites (Brazil) . . . . . *E. undecimartus* Günther  
Phallus without sclerites, only sclerotised bristle areas existing (*gurneyi-monticolus* group) . . . . . 3
3. Pronotum with narrow yellow border (Fig. 1b) only at lateral and caudal sides. Epiproct of male longer than broad. Sclerotisation of endophallus as in Figure 4a with 2 large bristle areas . . . . . *E. gurneyi* Günther  
Pronotum with broad yellow border, central disc with several black spots (Fig. 1a) . . . . . 4
4. Outer distal lobus genicularis of metafemur completely black; metafemur nearly entirely black (Arizona) . . . . . *E. gurneyi* var. *nigrofemurata* Günther  
Distal part of lobus genicularis of metafemur white. Epiproct of male about as long as broad . . . . . 5
5. Caudal margin of female subgenital plate parabolically rounded (Fig. 2).



- Endophallus with 2 long sclerotised areas densely covered with bristles  
 ..... *E. californicus*, n. sp.  
 Caudal margin of female subgenital plate with a medial truncated process.  
 Endophallus with 4 sclerotised areas densely covered with bristles (Fig.  
 4b) ..... *E. monticolus* Günther

## LITERATURE CITED

- Günther, K. K. 1977. Revision der Gattung *Ellipes* Scudder, 1902 (Saltatoria, Tridactylidae). Dtsch. Ent. Z., N.F., 24:47-122.

## PUBLICATIONS RECEIVED

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